In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import scipy.stats as st
import math
```

In [2]:
```
question_1=np.array([12.3, 14.2, 13.8, 14.5, 15.1, 12.7, 13.9, 15.2, 13.6, 14.0, 14.8, 14.4, 13.0, 14.7
])
```

In [3]:
```
sigma_1=4
```

In [4]:
```
n_1=len(question_1)
```

In [5]:
```
mean_1=np.mean(question_1)
mean_1
```

Out[5]: 14.014285714285714

In [6]:
```
z_99=st.norm.ppf(0.995)
z_99
```

Out[6]: 2.5758293035489004

In [7]:
```
b_1=mean_1+z_99*sigma_1/math.sqrt(n_1)
b_1
```

Out[7]: 16.76796306876929

In [8]:
```
a_1=mean_1-z_99*sigma_1/math.sqrt(n_1)
a_1
```

Out[8]: 11.260608359802138

In [9]:
```
question_2=np.array([72, 116, 79, 97, 90, 67, 115, 82, 95, 82])
```

In [10]:
```
sigma_2=np.std(question_2,ddof=1)
sigma_2
```

Out[10]: 16.58144880414388

In [11]:
```
n_2=len(question_2)
```

In [12]:
```
mean_2=np.mean(question_2)
mean_2
```

Out[12]: 89.5

In [13]:
```
t_95=st.t.ppf(0.975,n_2-1)
t_95
```

Out[13]: 2.2621571627409915

In [14]:
```
a_2=mean_2-t_95*sigma_2/math.sqrt(n_2)
a_2
```

Out[14]: 77.63834608725665

In [15]:
```
b_2=mean_2+t_95*sigma_2/math.sqrt(n_2)
b_2
```

Out[15]: 101.36165391274335

In [16]:
```
st.gamma.ppf(0.1,a=15,scale=1/(153))
```

Out[16]: 0.06731776017838348

In [17]:
```
st.gamma.ppf(0.9,a=15,scale=1/(153))
```

Out[17]: 0.13155563313304508

In [18]:
```
st.norm.cdf(1)
```

Out[18]: 0.8413447460685429

In [19]:
```
1-st.norm.cdf(1)
```

Out[19]: 0.15865525393145707

In [20]:
```
st.norm.cdf(1)/(1-st.norm.cdf(1))
```

Out[20]: 5.302974375068753

In [26]:
```
mu=(175/25+176*10/9)/(1/25+10/9)
```

In [27]:
```
s=1/(1/25+10/9)
```

In [28]:
```
st.norm.cdf((175-mu)/math.sqrt(s))
```

Out[28]: 0.15019059769993914

In [29]:
```
st.norm.cdf((175-mu)/math.sqrt(s))/(1-st.norm.cdf((175-mu)/math.sqrt(s)))
```

Out[29]: 0.17673445044669917

In [ ]:
```

```